

## ABSTRACT OF THE INVENTION

A method and system for generating a communication model are disclosed. The communication model is used to provide performance information on the use of communication networks by application code. The expected utilization of resources is  
5 important to when high performance is to be achieved in both cluster computing environments and information power GRIDs.

The disclosed method and system is designed to generate a model of an underlying network topology using detailed workload information, which encapsulates the expected computation/communication requirements of an application. Such workload  
10 information may be obtained from a number of different sources. Furthermore, the disclosed method provides detailed information of the expected use of a network system unlike traditional communication models that rely on statistical information and provide general performance information.

The disclosed method is a hybrid model containing statistical model information  
15 as well as steps for simulating the main stages that change the state of the communication network traffic. As such, the evaluation time is orders of magnitude quicker than traditional methods, while providing predictions, which are of reasonable accuracy. The characteristics of different networks can be easily incorporated into the model, and thus the model can be used in a variety of situations. The output of the model is the expected  
20 delay of a set of communications, which can be further, expanded into a suitable trace format and visualized for further investigation. In evaluation tests, the disclosed method and system provides predictions which are more accurate than simple regression models while requiring seconds of CPU processing time.

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